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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/724,897

12/02/2003

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YOR920030555US1

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21254

7590

01/21/2009

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EXAMINER

PHAM, HUNG Q

ART UNIT

PAPER NUMBER

2169

MAIL DATE

DELIVERY MODE

01/21/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,897	<b>Applicant(s)</b> CHANG ET AL.	
	<b>Examiner</b> HUNG Q. PHAM	<b>Art Unit</b> 2169	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,10,11,13,14,16-19,23,24,26,28-31,35,36 and 38-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,10,11,13,14,16-19,23,24,26,28-31,35,36,38-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## **DETAILED ACTION**

### ***Response to Amendment***

#### **Duplicate Claims, Warning**

The warning of duplication of claims 1 and 13 has been withdrawn.

#### **Claim rejections - 35 U.S.C. § 101**

The rejection of claims 26-31 and 33-37 under 35 U.S.C. § 101 has been withdrawn in view of the amendment.

#### **Claim rejections - 35 U.S.C. § 112**

The rejection of claims 1, 4, 6, 12, 17, 19, 31 and 38 under 35 U.S.C. § 112, 2<sup>nd</sup> paragraph, has been withdrawn in view of the amendment.

### ***Response to Arguments***

Applicant's arguments filed 10/21/2008 have been fully considered but they are not persuasive.

As argued by applicant (Remarks, Page 14):

*Hence, turning to the clear language of the claims, in Bergman there is no teaching or suggestion of: "... storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and indexing information in a semantic object database associated with a database storing said raw data", as required by independent claim 1. The remaining independent claims have similar wording.*

The examiner respectfully disagrees.

As recited in the claims, e.g., claim 1, the claimed languages "at least one of" in the step of generating, e.g., *generating at least one of*, clearly indicate either *a summary of attributes* or *a*

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*confidence level or a compact representation* is generated for the semantic object. Therefore, in the step of “generating the indexing information” and “storing the semantic object”, either one of the generated *summary of attributes* or *confidence level* or *compact representation* is associated with these steps, e.g., *generating indexing information for one or more of the summary of attributes, the confidence level, and the compact representation of said semantic object* and *storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and the indexing information in a semantic object database associated with a database storing said raw data*.

As disclosed by Bergman, raw data in lattice format, e.g., FMI images, is stored in raw data storage (Bergman, Page 457, 5.3.1 Preprocessing and ingestion, Lines 11-12). Object definitions are created by a domain expert. This set of definitions can be used to pre-extract semantic object allowing rapid retrieval at query time (Bergman, Page 457, 5.3.1 Preprocessing and ingestion, Lines 27-29). An example of object definition is in FIG. 4a, e.g., definition of semantic object shale. The object definition is based on texture features and gamma ray values, e.g., FMI texture, and gamma ray values. Example of pre-extracted semantic objects, e.g., shale, is in FIG. 5. The texture feature in the form of vector and feature values are extracted from image data and indexed (Bergman, Page 457, 5.3.1 Preprocessing and ingestion, Lines 32-51). The obtained semantic objects are stored with boundary information and associated attributes such as size and centroid (Bergman, Page 454, 5.1.1 Progressive Framework, Lines 14-15). The data repository for SPIRE includes a relational database for storing derived features and semantic objects (Bergman, Page 453, 5 System Architecture, Lines 13-15).

In short, the Bergman teaching reads on the claimed limitation *storing the semantic object along with its associated compact representation, and the indexing information in a semantic object database associated with a database storing said raw data*, e.g., the obtained semantic object as in FIG. 5 along with its texture feature and gamma ray value and the index information represented by derived vector and feature values in the relational database associated with the raw data storage.

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In view of the foregoing reasons, the rejection under 35 U.S.C. § 102 is continued as in the following manners.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 10, 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Regarding claim 10, the clause *the compact approximation* references to other items in the claim. It is unclear what item is being referenced.

Regarding claim 40, the clause *said polyline segment* references to other items in the claim. It is unclear what item is being referenced.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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**Claims 1, 3-6, 13, 14, 16-19, 26, 28 and 29-31 are rejected under 35 U.S.C. 102(b) as anticipated by Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications].**

Regarding claims 1, 13, 14 and 26, Bergman teaches a method for storing information for one or more semantic objects derived from raw data (Bergman, Abstract), the method comprising:

*receiving a semantic object extracted from said raw data and classified to comprise said semantic object, said received semantic object having one or more attributes* (Bergman, Page 454, 5.1.1 Progressive Framework, Lines 11-15));

*generating at least one of:*

*a summary of attributes of said semantic object by calculating one or more statistics of one or more of said one or more attributes of said received semantic object;*

*a confidence level of said received semantic object that quantifies a degree of certainty that said received semantic object has been correctly classified and/or labeled; and*

*a compact representation of raw data of said received semantic object (a compact representation of raw data of said received semantic object is generated as in FIG. 4a, e.g., definition of semantic object shale. The object definition is based on texture features and gamma ray values, e.g., FMI texture, and gamma ray values);*

*generating indexing information for one or more of the summary of attributes, the confidence level, and the compact representation of said semantic object* (Texture and the value are indexed (Bergman, Page 457 Lines 43-44 and 50-51)); and

*storing the semantic object along with its associated summary of attributes, confidence level, compact representation, and the indexing information in a semantic object database associated with a database storing said raw data* (As disclosed by Bergman, raw data in lattice format, e.g., FMI images, is stored in

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raw data storage (Bergman, Page 457, 5.3.1 Preprocessing and ingestion, Lines 11-12). Object definitions are created by a domain expert. This set of definitions can be used to pre-extract semantic object allowing rapid retrieval at query time (Bergman, Page 457, 5.3.1 Preprocessing and ingestion, Lines 27-29). An example of object definition is in FIG. 4a, e.g., definition of semantic object shale. The object definition is based on texture features and gamma ray values, e.g., FMI texture, and gamma ray values. Example of pre-extracted semantic objects, e.g., shale, is in FIG. 5. The texture feature in the form of vector and feature values are extracted from image data and indexed (Bergman, Page 457, 5.3.1 Preprocessing and ingestion, Lines 32-51). The obtained semantic objects are stored with boundary information and associated attributes such as size and centroid (Bergman, Page 454, 5.1.1 Progressive Framework, Lines 14-15). The data repository for SPIRE includes a relational database for storing derived features and semantic objects (Bergman, Page 453, 5 System Architecture, Lines 13-15). In short, the Bergman teaching reads on the claimed limitation *storing the semantic object along with its associated compact representation, and the indexing information in a semantic object database associated with a database storing said raw data*, e.g., the obtained semantic object as in FIG. 5 along with its texture feature and gamma ray value and the index information represented by derived vector and feature values in the relational database associated with the raw data storage).

Regarding claims 3, 16, and 28, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *a summary of attributes, confidence level, and/or compact representation is generated and stored in said semantic object database for each of a plurality of said semantic objects and said semantic object database can be searched* (Bergman, Page 455-457, 5.2 Query Specification).

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Regarding claims 4, 17, and 29, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 26, Bergman further discloses *a query used to search said semantic object database will identify any of a semantic object having attributes that match one or more terms of said query and the identified semantic object can selectively be retrieved, including selectively retrieving at least one of: any information in said semantic object database associated with said identified semantic object; and any of the raw data associated with said identified semantic object* (Bergman, Pages 455-457, 5.2 Query Specification, 5.2.1 DanDE User Interface, 5.3 Query Processing).

Regarding claims 5, 18, and 30, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 28, Bergman further discloses *an optimizing mechanism is used in searching to optimize the process of searching* (Bergman, Page 459 Lines 7-10, indicating a dimensionality reduction algorithm that locally reduces the dimensionality of the search space. Lines 5-6 indicate that the search process can be extremely time-consuming if a linear scan is performed, hence, the dimensionality reduction algorithm is presented as a time-saving optimization to the search process).

Regarding claims 6, 19, and 31, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the semantic object represents a model of a phenomena of interest that is measured by a collection of data which exceeds a data size that is accessible with a predetermined efficiency by multiple simultaneous users* (Bergman, Page 449 Lines 27 and 35, indicating that the semantic objects represent phenomena related to petroleum well-bore data, and that the volume of this data is extremely large).

**Claim 38 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bergman et al. [PetroSPIRE: A multi-modal**

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**content-based retrieval system for petroleum applications] and Li et al. [Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application].**

Regarding claim 38, Bergman teaches all of the claimed subject matter as discussed above with respect to claim 1, Bergman further discloses *the semantic object has been previously extracted* (As disclosed by Bergman at Page 457 Lines 27-29, the object definition can be used to pre-extract semantic object) and *comprises a channel* (Page 450, The Application Area).

The missing of Bergman is *geological seismic survey data* for extracting semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, obviously *geological seismic survey data*, e.g., seismic data, can be used to generate texture features and used the texture features for extracting semantic object.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 10, 11, 23, 24, 35, 36, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications] in view of Yu et al. [A Framework for Mining Sequence Database at Multiple Abstraction Levels].**

Regarding claims 10, 23, and 35, Bergman does not explicitly teach *the compact approximation comprises a multiple segment polyline*.

Yu teaches *the compact approximation comprises a multiple segment polyline* (Yu, Page 268 Col. 1 Lines 1-8, segmenting data, then finding a linear approximation to each segment. These line segments comprise a polyline, since a polyline is simply a line comprised of one or more line segments (see Wikipedia definition of polyline included in this Office Action)).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of summarizing a semantic object taught by Bergman by the method of approximating data by a polyline taught by Yu, because approximating a semantic object by a polyline enables similarity searches, particularly to identify data with similar geological features (Yu, Page 267, Col. 1 Lines 6-11 and Col. 2 Lines 4-6).

Regarding claims 11, 24, and 36, Yu further discloses *each segment of the multiple segment polyline comprises a best fit line having end point coordinates and a slope* (Yu, Page 270 Col. 1 Lines 22-

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25, showing the segments have endpoints; Page 270 Col. 1 Lines 41-43, showing the segments have a slope).

Regarding claim 39, Bergman and Yu, in combination, teach all of the claimed subject matter as discussed above with respect to claim 11, Bergman further discloses *an R-tree spatial index structure is used to facilitate a retrieval of a structure that approximates a polyline* (Bergman, Page 457, Lines 43-51).

Regarding claim 40, Bergman and Yu, in combination, teach all of the claimed subject matter as discussed above with respect to claim 11, Bergman further discloses *said polyline segments are searchable using one or more terms of a sub-query of a query* (Bergman, Page 457, Lines 43-51).

### **Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q. PHAM whose telephone number is 571-272-4040. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JAMES K. TRUJILLO can be reached on 571-272-3677. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG Q. PHAM/  
Primary Examiner  
Art Unit 2169

January 6, 2009